

REMARKS

The Final Office Action dated April 30, 2009 has been received and its contents carefully noted. From the Summary page, claims 1-28 were pending. Claims 6-13 have subsequently been withdrawn from consideration as being drawn to a non-elected invention. Claims 1-5 and 14-28 were rejected.

Entry of the amendment is respectfully requested since entry would lessen the issues on appeal, require no additional search and introduces no new matter.

By this response, Applicants have amended independent claims 1, 3, 4, 14, 15, 21, 22, 27, and 28 and cancelled claims 24-26. Accordingly, upon entry of the amendment, claims 1-5, 14-23 and 27-28 would be before the Examiner for consideration.

Claim Interpretation

The Examiner has interpreted claim 1 to include ternary, quaternary or quinary alloys where the descriptors, e.g. ternary, reflect the number of desired metals present in the compositions. Further, the Examiner has also indicated that the propriety of the descriptors used is not affected by the interstitial elements present. This interpretation appears consistent with the specification. In response, Applicants have further amended the claims to be consistent with this interpretation.

Claim Rejections - 35 U.S.C. §§ 102(b)

Claims 27 and 28 were rejected under 35 U.S.C. § 102(b) as being clearly anticipated by Furuta et al. (US 2003/0102062). Applicants respectfully traverse.

Claim 27, upon which claim 28 depends, has been amended to limit the claim to a ternary alloy, i.e. Ti/Nb/Zr. The claim further specifies the following amounts: 30 wt % >niobium ≥ 20 wt% and 2~15 wt % zirconium with the balance being titanium.

Furuta et al has been considered, especially the portions identified in the Office action. It is clear that sample no. 7 in paragraph [0142] does not teach a ternary alloy like that now claimed.

Since the amended claim 27 avoids the teachings of the reference, withdrawal of the rejection is believed to be in order and is requested.

Claim Rejections - 35 U.S.C. §§ 103(a)

Claims 1, 2, 5, 16 and 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Furuta et al. Applicants respectfully traverse.

Claim 1 is directed to one of a ternary alloy of Ti/Nb/Zr, a quaternary alloy of Ti/Nb/Zr/Sn or Ti/Nb/Zr/Al, or a quinary alloy of Ti/Nb/Zr/Sn/Al. In addition, claim 1 requires at least the following relative amounts: 30 wt % \geq niobium \geq 20 wt%, and 2~15 wt % zirconium. Claim 22, the other rejected independent claim, is similar to the ternary alloy of claim 1. Claim 22 limits the metals present through the use of a partially closed transition phrase. Claim 22 also specifies the relative amounts as: 30 wt % \geq niobium \geq 20 wt% and 2~15 wt % zirconium. The alloys of both claims are directed to nontoxic titanium alloy with extra-low modulus and superelasticity.

The published Furuta et al. application has been considered. It does not teach an alloy which is limited to: Ti/Nb/Zr, Ti/Nb/Zr/Sn, Ti/Nb/Zr/Al, or Ti/Nb/Zr/Sn/Al. Further, there is no mention of amount ranges of Nb and Zr like those claimed. Also, there is no mention of the benefits or properties of the claimed alloys as they appear on pages 3 and 4 of the instant specification.

The Examiner state that there are overlapping ranges and therefore there is a prima facie case of obviousness. Relative to the teachings of Furuta et al. and the claims as amended, one has to select at least Ti, Nb and Zr and then one has to arrive at the metal amounts claimed. There is no guidance in this regard that would have lead one to the selection of Ti, Nb and Zr and their amounts.

One can optimize the amounts of chemical components when there is a recognition of a result dependent variable involving concentration. Here, there is none identified. Also, there is no mention in Furuta et al. that selection of Ti, Nb, and Zr and optimizing of their amounts would lead to the composition as claimed and the attendant desirable properties.

A prima facie case of obviousness has not been established. Withdrawal of the rejection is respectfully requested.

Claims 1-5 and 14-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito et al. (U.S. Patent 6,607, 693) or over Hwang et al. (PG Pub. No. 2005/0072496).

Applicants respectfully traverse.

Claims 24 -26 have been cancelled. The rejection as to these claims is moot.

The requirements of amended claims 1 and 22 is discussed above. Claim 27 is similarly situated to the ternary alloy species of claim 1.

Both Saito et al and Hwang et al have been considered. Both fail to provide a prima facie case of obviousness due to the incompleteness of their teachings. The teachings of these references overlap but differ and therefore each will be discussed in turn.

Saito et al. teach Ti/Nb/Zr, Ti/Nb/Zr/Sn, and Ti/Nb/Zr/Al. See test sample Nos. 18, 33 and 37 and Tables 2-4. There is no teaching of Ti/Nb/Zr/Sn/Al. There is also no teaching of the ranges of amounts of Nb and Zr as claimed. The actual amounts of Nb taught by Saito et al. are excluded from the instant claims. Saito et al. teach a range of 30-60 %. See, e.g. claim1, col. 3, starting at line 59 and col. 5, starting at line 45. Saito et al. specifically states that values of elements of the Va group, e.g. Nb, less than thirty percent are undesired. See col.4 starting at line 7.

The Examiner states that his rationale for finding obviousness is that there are overlapping ranges. Here, Saito et al teach a range that excludes Nb range claimed. There is no overlap. Saito et al. further state that Nb values less than thirty percent and greater than sixty are not desired. It is not clear how such a teaching would have rendered the invention as claimed obvious.

Withdrawal of the rejection as it is based on Saito et al. is respectfully requested. A prima facie case has not been established. The reference teaches away from the invention.

Hwang et al. teach do teach Ti/Nb/Zr. There is no clear teaching of Ti/Nb/Zr/Sn, Ti/Nb/Zr/Al and Ti/Nb/Zr/Sn/Al. See Table 1. There is also no teaching of the relative amounts of Nb and Zr. See Table 1. The claimed ranges are not taught. The actual amounts of Nb taught by Hwang et al. are excluded by the instant claims. Hwang et al. teach a range of 30-60 %. See, e.g. claim1, and paragraph [0026]. Hwang et al. specifically states that values less than thirty percent of elements of the Va group, e.g. Nb, are not desired. See paragraph [0064].

The Examiner states that his rationale for finding obviousness is that there are overlapping ranges. Here, Hwang et al. teach Nb range which would avoid overlap with the instant claims. Hwang et al. further state that values less than thirty for Group Va elements, e.g. Nb, and greater than sixty percent are not desired. This is a teaching away from the invention as claimed.

Accordingly, a prima facie case has not been established. Withdrawal of the rejection as based on Hwang et al. is respectfully requested.

CONCLUSION

All of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Therefore, it is respectfully requested that the Examiner reconsider all presently outstanding rejections or objections and that they be withdrawn. It is believed that a full and complete response has been made to the outstanding Office Action and, as such, the present application is in condition for allowance.

If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

If any fees are due in connection with the filing of this Amendment, such as fees under 37 C.F.R. §§1.16 or 1.17, please charge the fees to Deposit Account 02-4300; Order No. 033792R005.

Respectfully submitted,

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